REMARKS

The following is intended as a full and complete response to the Office Action mailed on February 24, 2005. Claims 1-19 were examined. The Examiner rejected all of the claims under 35 U.S.C. §103(a) as obvious in view of Cao (U.S. Patent No. 6,493,141) in combination with Yao (U.S. Patent No. 6,687,423). The Examiner also rejected claims 7 and 16 under 35 U.S.C. §112, second paragraph, for failing to particularly point out and claim the subject matter of the invention.

Claim Rejections under §112, Second Paragraph

The Examiner rejected claims 7 and 16 under §112, second paragraph, for having certain antecedent basis deficiencies. In response, Applicant is amending claims 7 and 16 to address the Examiner's rejections. Applicant therefore respectfully requests that the rejections under §112, second paragraph, be withdrawn.

Claim Rejections Under 35 U.S.C. § 103(a)

Claim 1 recites the limitations of a polarization beam splitter that is optically coupled to a first polarization modulator on a first side and optically coupled to a second polarization modulator on a second side, where the second side is the side of the polarization beam splitter opposite to the first side. Neither Cao nor Yao teaches or suggests the claimed polarization modulators.

The Application makes clear that a polarization modulator is a component that "either may or may not, in response to a control signal applied thereto, rotate by 90 degrees the polarization plane orientation of plane-polarized light that passes therethrough." See Application at p. 7, lines 9-12. An example of such a component is a liquid crystal modulator apparatus. The import of having these components in the reconfigurable channel dropping demultiplexer recited in claim 1 is that they enable the demultiplexer to operate in different states. Figures 1A and 1B of the Application show examples of two such states. In Figure 1A, polarization modulator 104a is configured to rotate plane-polarized light, and polarization modulator 104b is not. With these settings, the claimed demultiplexer drops one of the signals input into first polarization port 116a, while outputting the remaining signals through the second polarization port 116b. In Figure 1B, both polarization modulators 104a and 104b are configured to not rotate plane-

polarized light. With these settings, the claimed demultiplexer outputs through the second polarization port 116b all of the signals input into first polarization port 116a, without dropping any channels. The fact that the configuration of each of the polarization modulators 104a and 104b may be controlled allows the operating state of the claimed demultiplexer to be switched as desired. These different operating states are the subject matter of claims 7-8, for example.

By contrast, Cao discloses a combination of a non-reciprocal optical rotator (e.g., element 106) and a reciprocal optical rotator (e.g., element 108) that, in combination, provide a 90 degree polarization plane rotation for light propagating through both rotators in a given direction. See Cao at col. 8, lines 8-35 and Figure 1f. These rotators are static and therefore cannot be controlled to either provide or not provide a 90 degree polarization plane rotation. Unlike the claimed polarization modulators, these optical rotators always provide a 90 degree polarization plane rotation for light propagating in a given direction.

Similarly, Yao discloses the use of a first polarization transformer 130A and a second polarization transformer 130B. Each of these components is designed "to produce a total rotation in polarization of about 90 degrees in light reflected from the respective filter after passing through the transformer a second time." See Yao at col. 3, lines 3-12. Like the optical rotators disclosed in Cao, these polarization transformers are static and, unlike the claimed polarization modulators, always rotate the polarization of light by about 90 degrees. In addition, these polarization transformers also require light to pass through them twice before rotating the polarization. But when the claimed polarization modulators are configured to provide a 90 degree polarization plane rotation to light, they do so the first time the light passes through them.

In sum, because the optical rotators disclosed in Cao and the polarization transformers disclosed in Yao only have one static state where they provide a 90 degree polarization plane rotation to light, any structure produced by combining the teachings of Cao and Yao will not have the ability to operate in different states like the reconfigurable channel dropping demultiplexer recited in claim 1.

As the foregoing illustrates, neither Cao nor Yao teaches or suggests the first polarization modulator or the second polarization modulator recited in claim 1. This failure precludes the combination of Cao and Yao from rendering claim 1 obvious. For this reason, Applicant respectfully submits that claim 1 is in condition for allowance and requests withdrawal of the

§103(a) rejection of this claim. Further, since claims 2-11 depend on allowable claim 1, these claims also are in condition for allowance.

In addition, each of independent claims 12, 18 and 19 recite limitations similar to those discussed above in connection with allowable claim1. Therefore, these claims are in condition for allowance for at least the same reasons as claim 1. Further, since claims 13-17 depend from allowable claim 12, these claims also are in condition for allowance.

Claims 2-3 further recite the limitations of a first quarter-wave plate optically coupled to the polarization beam splitter at a third side that is not parallel to either of the first two sides and a second quarter-wave plate optically coupled to the polarization beam splitter at a fourth side that is opposite to the third side and a mirror that is optically coupled to the second quarter-wave plate at a side opposite to the polarization beam splitter. The Examiner refers to Figure 6h of Cao as disclosing these limitations. Applicant respectfully traverses. The Examiner has already taken the position that the combination of optical rotators 202 and 204 is equivalent to the first polarization modulator recited in claim 1 (Figure 1f of Cao clearly shows that both of these optical rotators are needed to rotate the polarization by 90 degrees, not just one of the rotators) and that the combination of optical rotators 106 and 108 is equivalent to the second polarization modulator recited in claim 1. The Examiner cannot now point to these same elements as also disclosing the quarter-wave plates claimed in claims 2 and 3. In addition, element 670 in Figure 6h is non-linear interferometer, not a mirror, as recited in claim 3. Unlike a mirror, the non-linear interferometer rotates the polarization of light transmitted to and from it. Further, the Examiner has not explained how element 670 is optically coupled to a second quarter-wave plate at a side opposite to the polarization beam splitter, as recited in claim 3. Based on the foregoing, Applicant contends that Figure 6h of Cao does not disclose the structures recited in claims 2 and 3 and therefore submits that these claims are in condition for allowance for this reason as well.

Claims 13-14 recite limitations similar to those discussed above in connection with allowable claims 2-3. Applicant therefore contends that Figure 6h of Cao also does not disclose the structures recited in claims 13-14 either. Thus, Applicant respectfully submits that these claims are in condition for allowance for this reason as well.

Claims 4 and 15 recite the limitation of an optical channel band pass filter optically coupled to the first quarter-wave plate at a side opposite to the polarization beam splitter. The Examiner refers to Figure 6A of Yao as disclosing this limitation. Although Figure 6A of Yao

arguably discloses an optical channel band pass filter (element 610), Figure 6A does not disclose the claimed structure where the filter is coupled to the first quarter-wave plate as a side opposite to the polarization beam splitter. Further, the Examiner has not explained how such a structure could be incorporated into Figure 5b of Cao. Based on the foregoing, Applicant contends that Figure 6A of Yao does not disclose the structure recited in claims 4 and 15 and therefore submits that these claims are in condition for allowance for this reason as well.

Several of the pending claims also recite a third quarter-wave plate (e.g., claim 5, claim 6, claim 15) having a specific structural relationship to the other components in the claimed reconfigurable channel dropping demultiplexer. The Examiner again refers to Figure 6h of Cao as disclosing these limitations. However, as previously explained, at most Figure 6h discloses one quarter-wave plate once the Examiner's position that optical rotators 202 and 204 are equivalent to the first polarization modulator and optical rotators 106 and 108 are equivalent to the second polarization modulator is considered. Figure 6h of Cao therefore cannot also teach the third quarter-wave plate as suggested by the Examiner. For this additional reason, Applicant submits that any pending claim reciting a third quarter-wave plate, regardless of structure, is in condition for allowance.

Finally, the Examiner argues that one skilled in the art would have been motivated to modify the channel separator in Figure 5a of Cao such that optical rotators 106 and 108 are coupled to the polarization beam splitter on a side opposite to the side to which optical rotators 202 and 204 are coupled (as purportedly shown in Figure 6A of Yao) to effect the desired polarization states on light transmitted through the channel separator. However, if Figure 5b of Cao were so modified, the desired polarization states would not be effected. For example, if optical rotators 106 and 108 (which the Examiner argues are equivalent to the claimed second polarization modulator) were moved such that they were disposed on the side of polarization beam splitter 104 opposite of optical rotators 202 and 204, then the polarization of the light transmitted from non-linear interferometer 110 to polarization beam splitter 102 would not be rotated by 90 degrees (because the light would no longer pass through optical rotators 106 and 108). The would cause the light to pass through polarization beam splitter 102 to port 116a, instead of reflecting up to reflector 112 and then to port 116b. Likewise, if optical rotators 106 and 108, polarization beam splitter 102, reflector 112 and port 116b were all moved such that they were disposed on the side of polarization beam splitter 104 opposite of optical rotators 202

and 204, then the light transmitted from non-linear interferometer 110 would simply pass through polarization beam splitter 104 to port 116a. In either case, the light transmitted from non-linear interferometer 110 would not be properly polarized or transmitted.

As the foregoing illustrates, the desired polarization states would not be effected on light transmitted through the channel separator of Figure 5b if the channel separator were modified as the Examiner suggests. One skilled in the art, therefore, would not be motivated to modify the channel separator as suggested by the Examiner. Further, the modification would result in light transmitted from non-linear interferometer 110 being output at port 116a instead of being output at port 116b. Thus, the modification would render the channel separator of Figure 5b unsatisfactory for its intended purpose – to separate (even) channels from the input beam and output the separated channels at port 116b. For these reasons, Applicant respectfully submits that the Examiner erroneously combined Cao and Yao. Thus, these references cannot be used in combination to render any of the pending claims obvious.

Conclusion

Having addressed all issues set out in the office action, Applicant submits that the pending claims are in condition for allowance. If the Examiner has any questions, please contact the Applicant's undersigned representative at the number provided below.

Respectfully submitted,

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